Service Manual

Direct Drive Automatic Turntable System

SL-1900 (M, MC)

- The model SL-1900 (M) is available in America only.
- The model SL-1900 (MC) is available in Canada only.

Specifications Specifications are subject to change without notice for further improvement. Weights and dimensions shown are approximate.

General

Power supply	AC 120 V, 50 or 60 Hz
Power Consumption	6W
Dimensions (H x W x D)	13.7 x 43.0 x 33.4 cm (5-3/8 x 16-15/16 x 13-1/8 inches)
Weight	7.2 kg (15.9 lbs.)

Turntable section

Type	Direct Drive Automatic Turntable System, Automatic start, Automatic return, Automatic shut-off, Repeat play with convenient "memo-repeat" knob and Manual play
Drive method	Direct Drive
Motor	Back Electromotive Force Frequency Generator servo DC motor employing one chip IC
Turntable platter	Aluminum die-cast, 31 cm (12-1/8")
Turntable speeds	33-1/3 and 45 r.p.m.
Pitch controls	Individual adjustment controls, 10% ajustment range
Wow and flutter	0.03% W.R.M.S. (JIS C5521) ±0.042% Weighted zero to peak (DIN 45507)
Rumble	–73 dB (DIN 45539B) –50 dB (DIN 45539A)

Tonearm section

Type	Universal tubular arm, static-balanced type	
Effective length	230 mm (9-1/16")	
Overhang	15 mm (9/12")	
Friction	Within 7 mg (horizontally and vertically)	
Tracking error angle	Within +3°	at the point of 145 mm (5-45/64") from the center
	Within +1°	at the point of 55 mm (2-3/16") from the center
Offset angle	21.5°	
Adjustable stylus pressure range	0 to 3 g (stylus pressure direct reading type)	
Cartridge weight range	5 to 10 g	
Headshell weight	9.5 g	

Technics by Panasonic

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320 Waiakamilo Road, Honolulu,
Hawaii 96817

Matsushita Electric of Canada Ltd.
40 Ronson Drive, Rexdale,
Ontario, Canada M9W 1B5

■ PARTS IDENTIFICATIONS

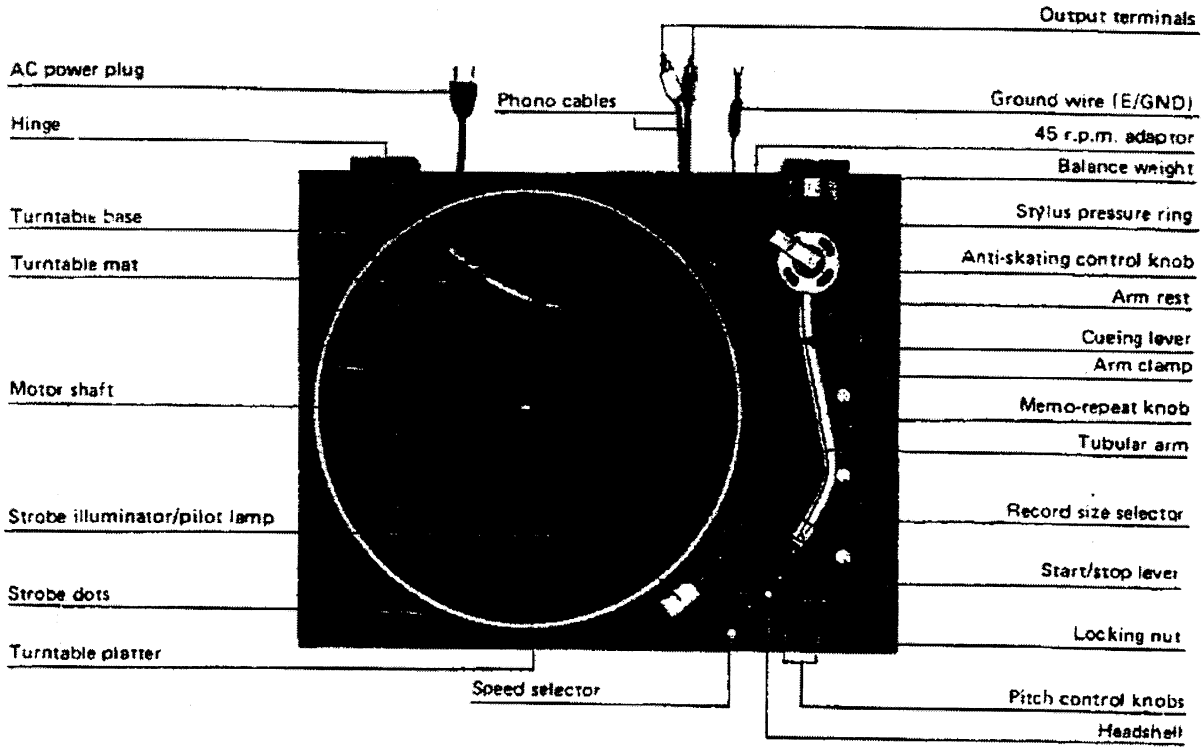


Fig. 1

■ TO REMOVE CABINET AND BOTTOM COVER

1. Remove the cartridge.
2. Fix the tone arm to the arm rest.
3. Remove the turntable.
4. Remove the operation cover.
5. Remove the speed selector knob and the pitch control knobs (Fig. 2)
6. Turn the player set upside down with good care not to damage the acryl cover.
7. Take off 8 vis-screws from the bottom cover. (Fig. 3)
8. Place the player set face upward holding it with both hands so that the body is not separated from the main body.
9. For separation of the body from the bottom cover, turn the cueing lever upward, move the tone-arm in board direction, then lift up the body. (Fig. 4)

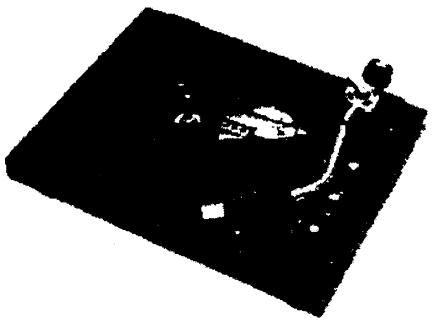


Fig. 2

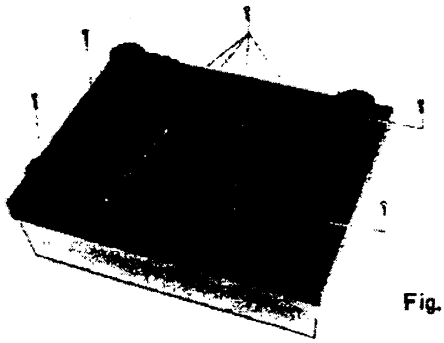


Fig. 3

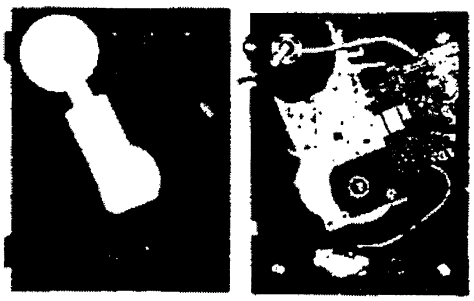


Fig. 4

■ ADJUSTMENT - 1

Adjustments of the horizontal "0" balance and the stylus pressure.

Note:

Before adjusting the horizontal "0" balance, confirm following items.

1) Make sure that the cueing lever is in the lowered position as shown in Fig. 5.
2) Make sure that speed selector is in the "." position, the balance adjustment is easily made as the turntable platter remains stationary. (See Fig. 1).
3) Make sure that the anti-skating control knob is at "0" position. (See Fig. 5).
   There are cases where the tonearm may sway or flow slightly at the position of "0" due to the highly sensitive rotational part of the tonearm, but this side force is trivial and presents no inconvenience.
4) Make sure that the "memo-repeat" knob is located at the "0" position. (See Fig. 1).

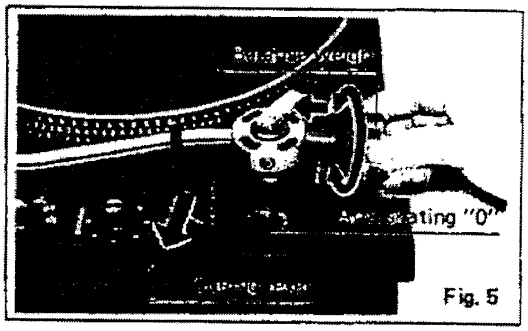


Fig. 5

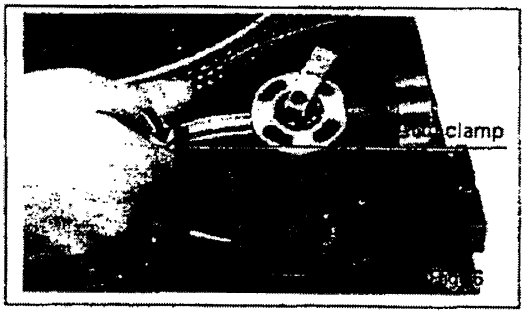


Fig. 6

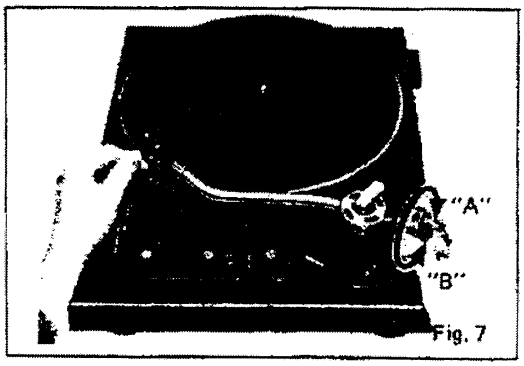


Fig. 7

①Insert the balance weight onto the rear shaft of the tonearm. (See Fig. 5).

②Remove the stylus cover, if your cartridge has one.

③Release the arm clamp (See Fig. 6) and lift the tonearm from the arm rest to free the tonearm. (See Fig. 7)

Note:

If the tonearm is urged to return to the arm rest when the tone-arm is held in a free state as in Fig. 7, rotate the turntable platter clockwise about 10 times. This is necessary because in rare cases the automatic mechanism may have engaged the tonearm gear or moved out of its normal position during transportation.

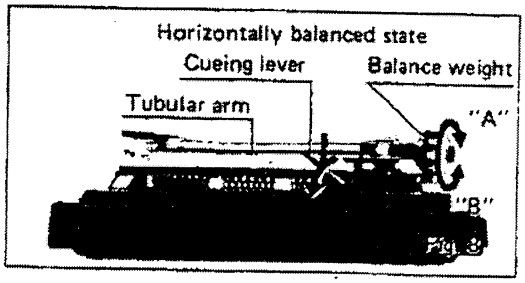


Fig. 8

④Turn the entire balance weight clockwise (indicated by the arrow "A") or counterclockwise (indicated by the arrow "B") until the tonearm is approximately balanced horizontally. (See Figs. 7 and 8).

Note:

During the adjustment of the horizontal balance, be sure that the stylus tip of the cartridge does not contact the turntable mat or turntable base.

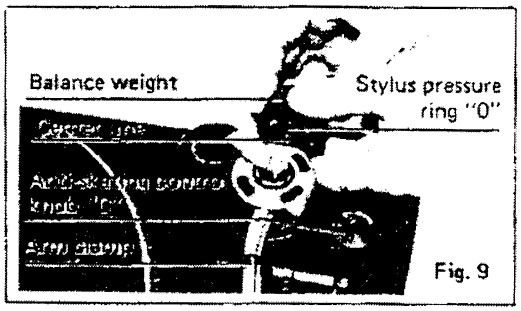


Fig. 9

⑤After the tonearm is horizontally balanced, temporarily fix the tonearm by the arm clamp. (See Fig. 9).
Hold the balance weight stationary with fingers as shown in Fig. 9 and rotate only the stylus pressure ring to bring the numeral "0" of the ring into alignment with the center line on the tonearm rear shaft. (The adjustment of the horizontal balance is now completed.)

⑥ After adjusting the horizontal balance, turn the balance weight clockwise in the direction of the arrow and align the correct stylus pressure. (Follow the cartridge manufacturer's recommendation.) (See Fig. 10).

As the stylus pressure ring rotates together with the balance weight, proper stylus pressure can be selected by directly reading the graduated ring.

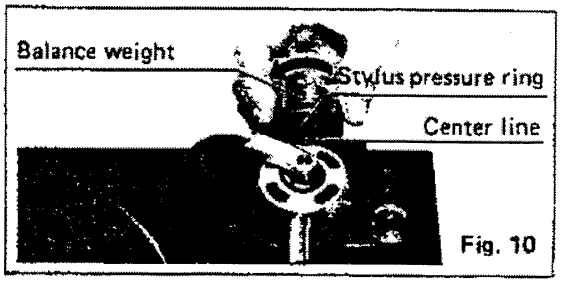


Fig. 10

Note:
Set the stylus pressure to the maximum value of your cartridge in cases where the record has an extremely high recording level, or where the unit is operated in a room at low temperature or in places in which the unit is liable to be subjected to vibrations.

Anti-skating control.
Set the anti-skating control knob to the same value as that set for stylus pressure. (See Fig. 11).

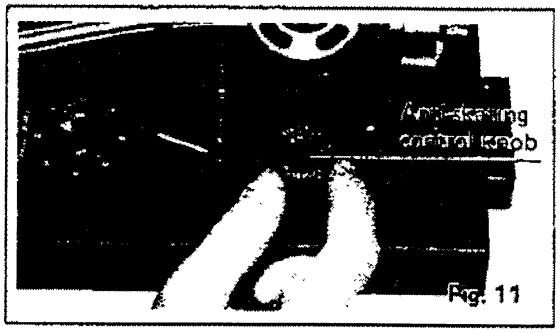


Fig. 11

■ ADJUSTMENT - 2

Adjustment of the arm lift height. (See Figs. 12 and 13).
The arm lift height (distance between the stylus tip and record surface when cueing lever is raised) has been adjusted at the factory before shipping to approximately 5 to 10 mm. (In this case, cartridge height is 18 mm).
If the clearance becomes too narrow or too wide because of the physical size of the different cartridges on the market, turn the adjustment screw clockwise or counterclockwise, at the same time pushing the arm lift down.

Clockwise rotation
—distance between the record and stylus tip is reduced.
Counterclockwise rotation
—distance between the record and stylus tip increases.

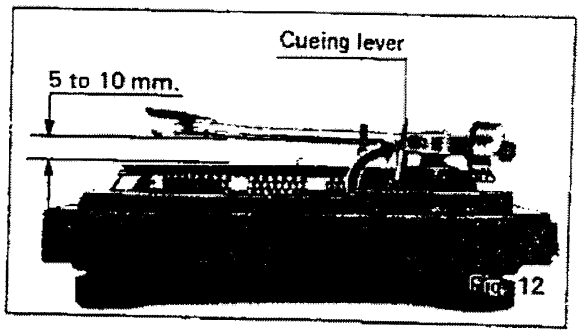


Fig. 12

Note:
As the adjusting screw has a hexagon head, be sure to make the adjustment while depressing the arm lift.

Adjustments for automatic start and automatic return positions. (See Fig. 14).
Should the tonearm not function correctly, make adjustments according to the following procedures.

Adjustment for automatic start position (Remove the rubber cap.)
In cases where the stylus tip descends outside of the record
—Move clockwise.
In cases where the stylus tip descends onto halfway of a recorded piece
—Move counterclockwise.

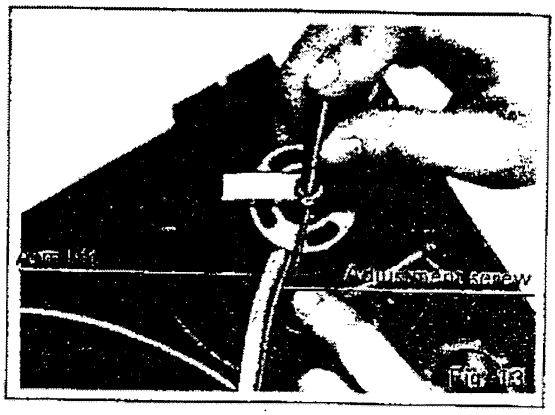


Fig. 13

Adjustment for automatic return position (Remove turntable mat.)
In cases where the tonearm tends to return before the playing has finished
—Move clockwise.
In cases where the tonearm fails to return after the last groove of the record
—Move counterclockwise.

Speed adjustment. (See Fig. 15).
Strobe dots are set on the rim of the turntable platter according to the power frequency and the number of revolutions of the records. Make adjustment, referring to strobe dot indication.

Set the speed selector to the number of revolutions to be adjusted.

Release the arm clamp and raise the cueing lever.

Move the tonearm to a slight extent towards the turntable platter. The strobe illuminator/pilot lamp will elluminate the strobe dots, and the turntable platter will rotate.

While turning the pitch control knobs either to "+" side or "−" side, adjust to such an extent that the strobe dots of the turntable platter look as if they were stationary. The state under which the strobe dots seem to be stationary represents the correct speed.

"+" direction

This increases the speed of the turntable rotation, and the strobe dot pattern seems to flow in the same direction as the turntable platter.

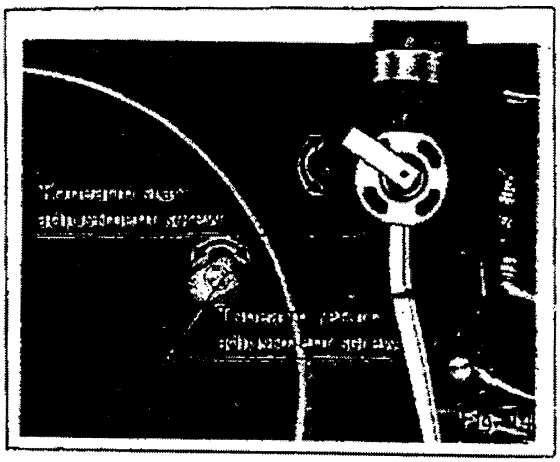
"−" direction

This decreases the speed of the turntable rotation, resulting in a state opposite to that in the "+" direction.

Note:

Strobe dot pattern

The strobe illuminator/pilot lamp of this unit employs the commercially available power source. The fequency of such power source, when actually measured, has a fluctuation of about 0.2%. As such a fluctuation of the power source affects the strobe illuminator, the strobe dot pattern also seems to fluctuate to a certain extent. But the unit is not affected by the fluctuations of the power source, since a D.C. motor is employed.



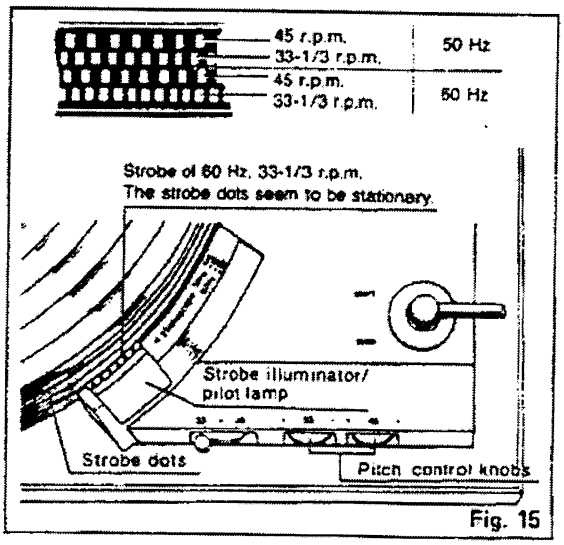


Fig. 15

■ Operation principles of the SL-1900

This unit, like the SL 1300 has a rational motor structure, and its drive control circuit is the B.F.G. type (Back TECHNICAL EXPLANATION electromotive force frequency generator) which is constructed on a single integrated circuit (IC) chip (AN630). The following is a block diagram of the IC (AN630) for which the operating principle will be briefly explained.

■ Operating principle

The back electromotive force, which is generated by the drive coil winding according to the rotation of the motor, is detected and converted to a frequency signal that is proportional to the number of revolutions.
Conversion is performed by a wave-shaping circuit and a logic circuit (This is referred to as the B.F.G. method). This frequency signal is compared with a standard signal by means of a frequency-voltage conversion circuit which converts it to a voltage signal in order maintain a constant number of revolutions. After removing unnecessary frequency components, with the operational-amplifier active filter, from this voltage signal, it controls the current flow in three differential switching circuits. As a result, the flow of current in the drive coil winding is always constant maintaining the correct rotational speed. Control of the rotational speed can be performed by means of adjusting the standard signal generator circuit according to the rotational speed adjustment circuit.

■ Explanation of each part

1. B.F.G. METHOD (BACK ELECTROMOTIVE FORCE FREQUENCY GENERATOR)

Making use of the back electromotive force that is generated in the drive coil winding of the motor as a frequency generator, the frequency of the frequency generator is converted to the number of revolutions for the turntable.
After shaping the wave form of this back electromotive force, it is composed logically, and a frequency is generated that is proportional to the number of revolutions. This is the use of the B.F.G. Making use of the drive coil winding, frequency generator coil windings and magnets are not necessary, yielding a motor structure that is very compact.

2. FREQUENCY-VOLTAGE CONVERSION CIRCUIT

Being composed of a trapezoidal wave generating circuit, a pulse generating circuit and a sampling integration circuit, the B.F.G. output frequency is converted to a voltage, and control output voltage is generated in order to maintain the rotational speed of the turntable at a constant level.

3. OPERATION CONTROL CIRCUIT

The operation control circuit functions as a control output voltage control keeping the rotational speed of the turntable constant with regard to the start of turntable operation and the operation of the mechanism. With this circuit, transient response characteristics and starting characteristics are very good.

4. OPERATIONAL AMPLIFIER (OP AMP) ACTIVE FILTER

Because of using an operational amplifier in the active filter, an ideal filter operation is possible.
As a result, such high performance as a signal-to-noise (SN) ratio of 60 dB (IEC-B) and a wow-and-flutter level of 0.03% (WRMS) have been achieved.

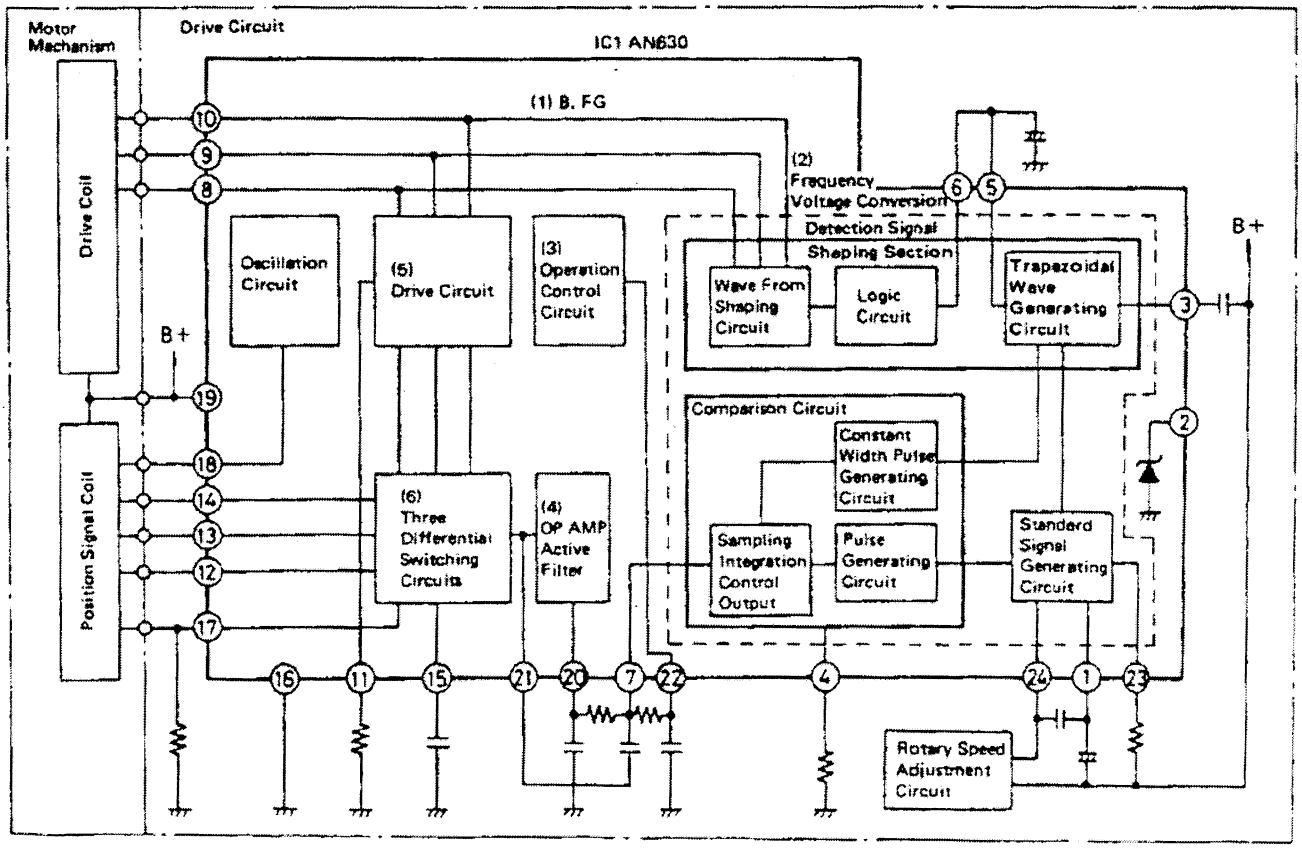
5. DRIVE CIRCUIT

By incorporating a large capacity power transistor in the integrated circuit, a starting torque of 1 kg-cm can be obtained. By means of this large starting torgue, prompt starts have been realized.

6. THREE DIFFERENTIAL SWITCHING CIRCUITS

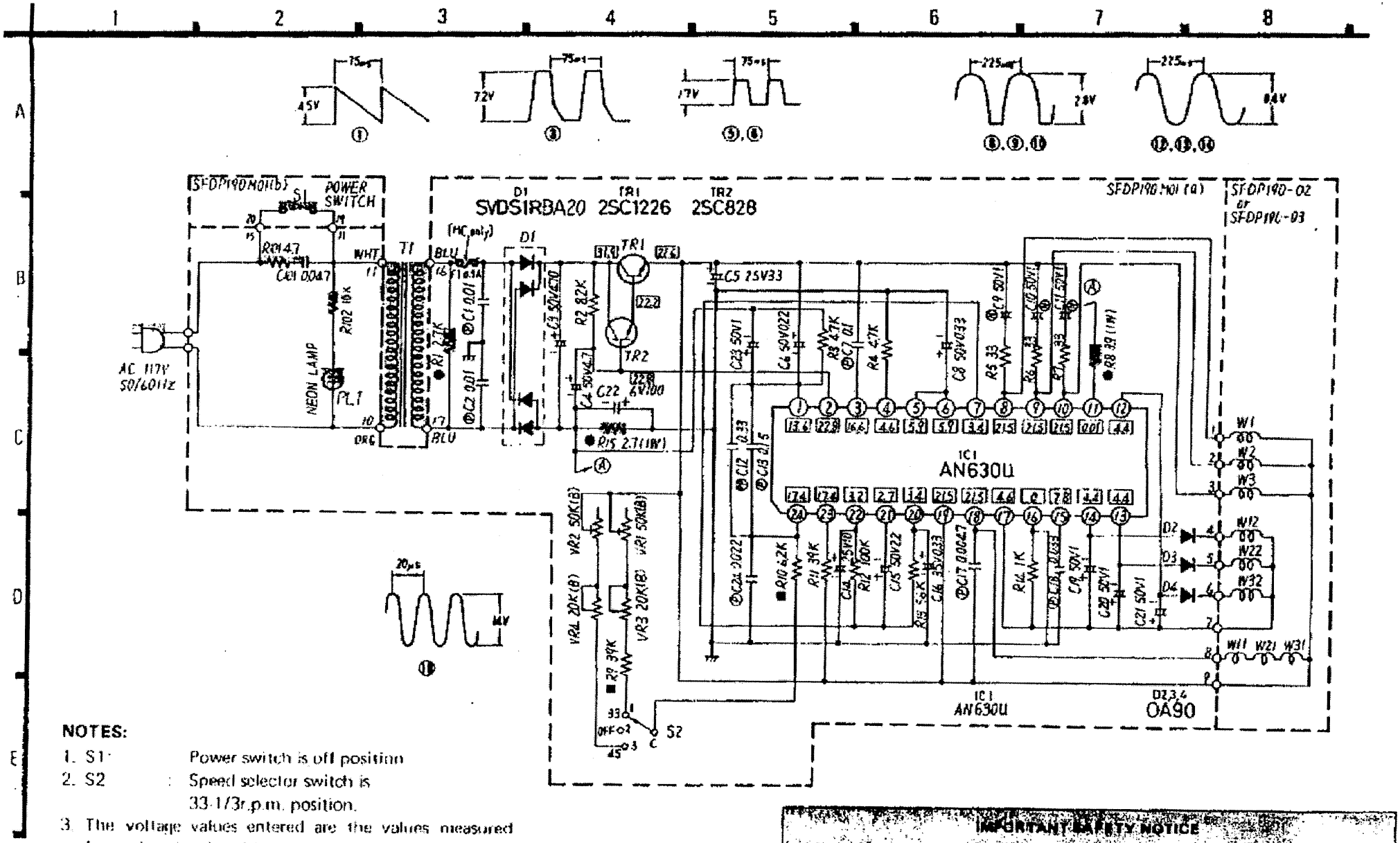
By means of the signal from the position signal coil, the starting circuit power transistor selector operates, obtaining smooth rotation.

■ Block diagram



■ Schematic Diagram

(This schematic diagram may be modified at any time with the development of new technology)



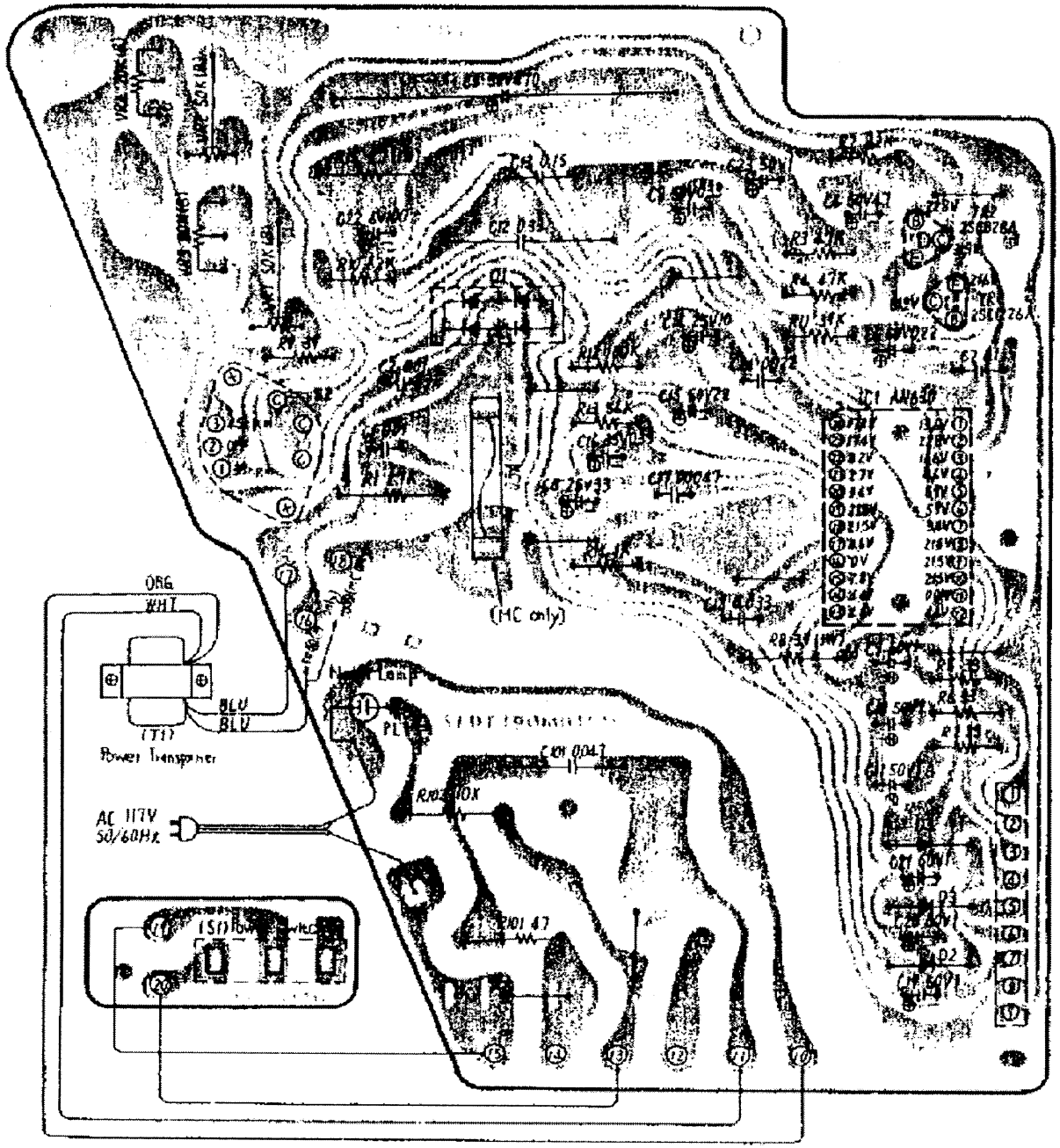
NOTES:

1. S1 : Power switch is off position
2. S2 : Speed selector switch is 33-1/3r.p.m. position.
3. The voltage values entered are the values measured from the chassis with a standard tester that has an internal resistance of 100KΩ /V at a rotational speed of 33-1/3 r.p.m.

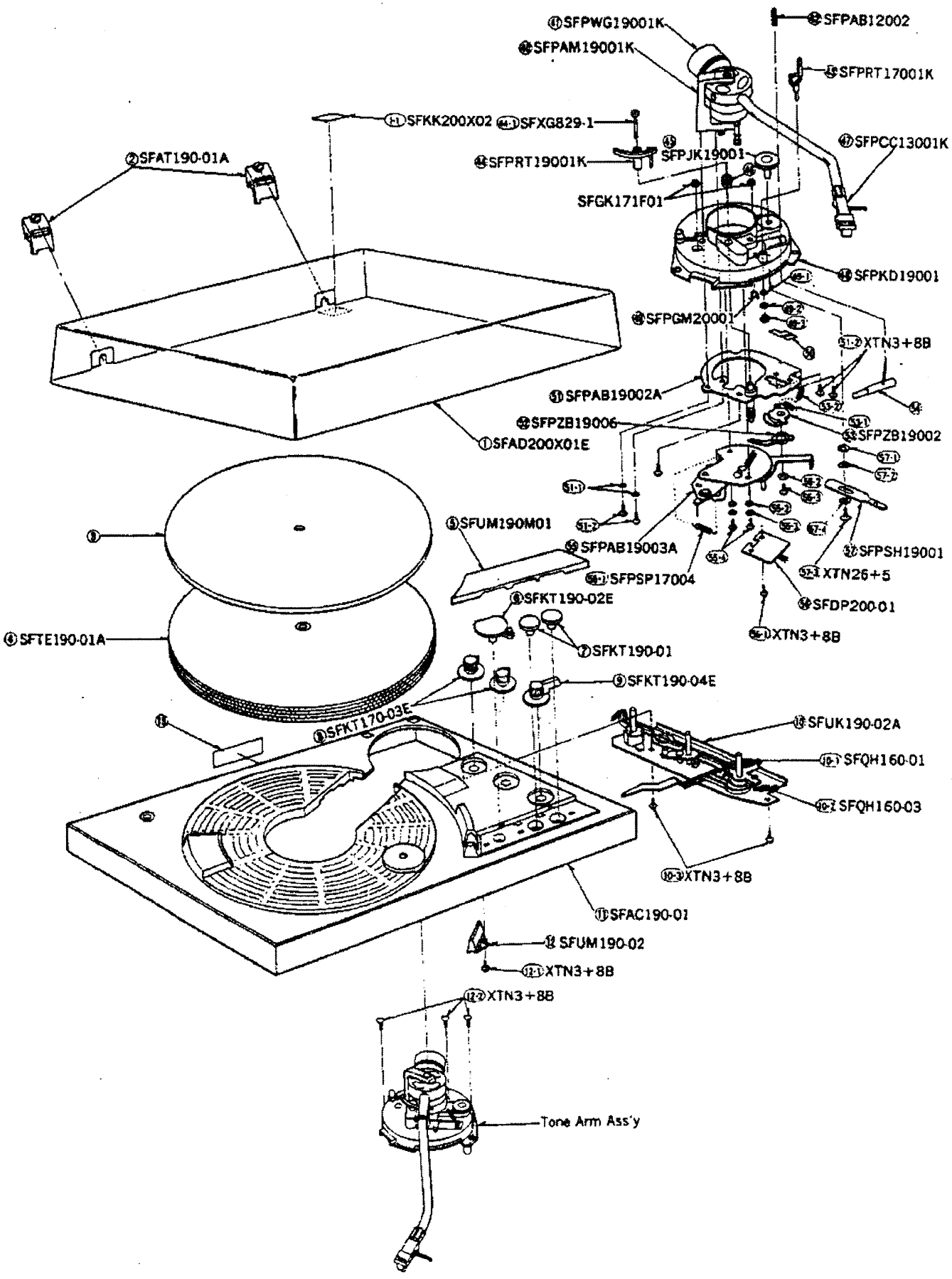
IMPORTANT SAFETY NOTICE

THE SHADED AREA ON THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR SAFETY. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURER'S SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SHADED AREAS OF THE SCHEMATIC.

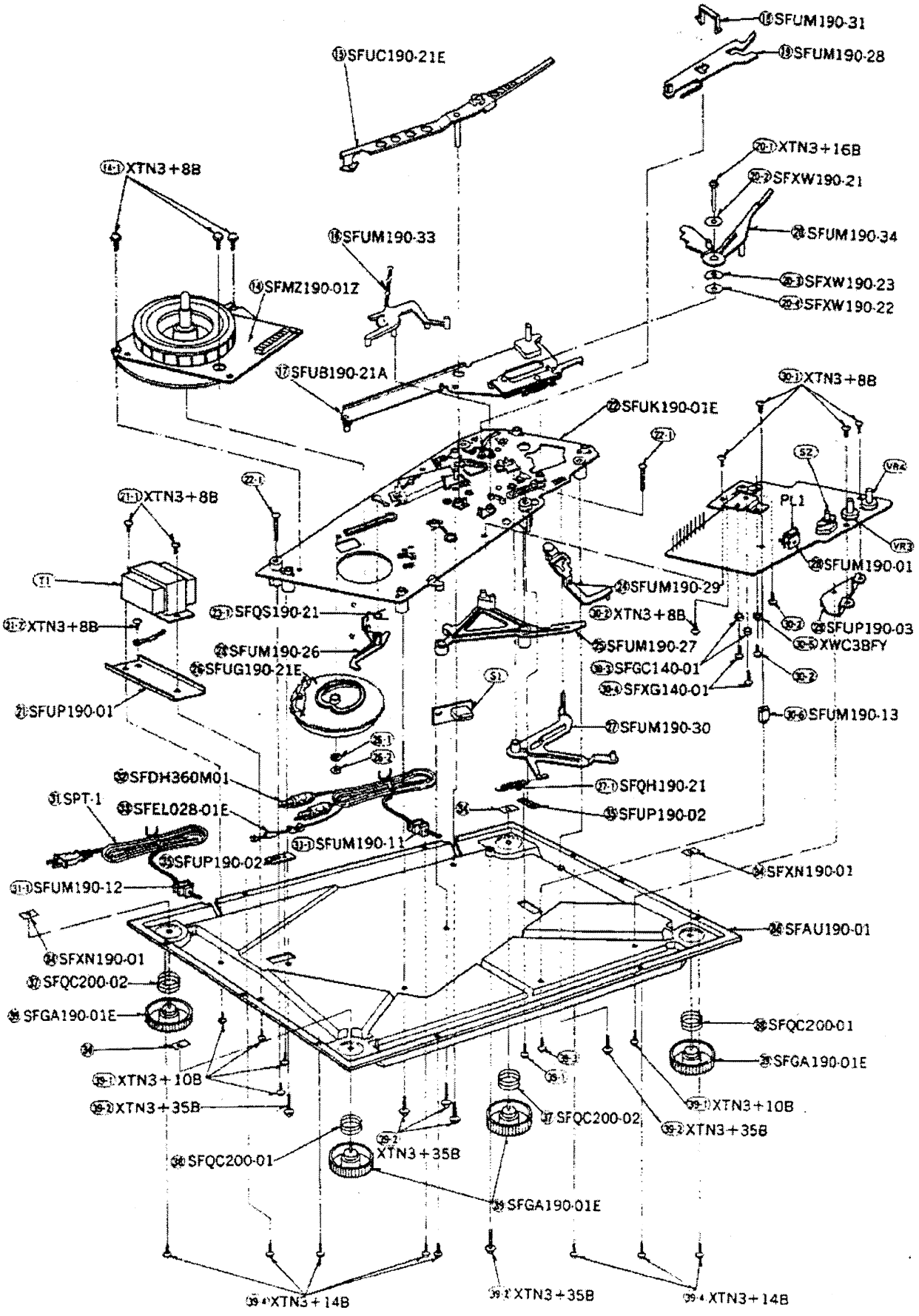
■ Circuit Board Wiring View



■ EXPLODED VIEW OF TURNTABLE



■ EXPLODED VIEW OF TURNTABLE



■ REPLACEMENT PARTS LIST

Components identified by shaded area have special characteristics important for safety. Replace only with part number specified.

Note. 1 Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2 (M) is available in America only
(MC) is available in Canada only

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
INTEGRATED CIRCUIT					
IC	AN630U	Integrated Circuit	1		
TRANSISTORS					
TR1	2SC1226A-O	Transistor	1		
TR2	2SC1328-T	Transistor	1		
DIODES					
D1	SVDS10BA20	Diode	1		O
D2, 3, 4	OA90	Diodes	3		
TRANSFORMER					
T1	SUT41PU1A	Power Transformer	1		O
FUSE					
F1	SAF250V1.6A	1.6A	1		
LAMP					
PL1	SPDNE2HU	Neon Lamp	1		
SWITCHS					
S1	SPDSS50GL	Main Switch, Power	1		
S2	PSRET13F10AE	Speed Selector Switch	1		O
VARIABLE RESISTORS					
VR1, 2	EVLS3AA00B54	50k Ω, Pitch Controls	2		
VR3,4	EVH-L0AF75B24	20k Ω Speed Adjustment	2		
RESISTORS					
R1	ERG1AJ222	Metallic, 2.2k Ω, 1W, ± 5%	1		
R2	ERD25TJ822	Carbon, 8.2k Ω, 1/4W, ± 5%	1		
R3, 4	ERD25TJ472	Carbon, 4.7k Ω, 1/4W, ± 5%	2		
R5, 6, 7	ERD25TJ330	Carbon, 33 Ω, 1/4W, ± 5%	3		
R8	ERX1AJ2R7	Metallic, 2.7 Ω, 1W, ± 5%	1		
R9	ERD25CKF3902	Metallic, 39k Ω, 1/4W, 1%	1		
R10	ERD25CKF6202	Metallic, 62k Ω, 1/4W, 1%	1		
R11	ERD25TJ393	Carbon, 39k Ω, 1/4W, ± 5%	1		
R12	ERD25TJ104	Carbon, 100k Ω, 1/4W, ± 5%	1		
R13	ERD25TJ563	Carbon, 56k Ω, 1/4W, ± 5%	1		
R14	ERD25TJ102	Carbon, 1k Ω, 1/4W, ± 5%	1		
R15	ERX1AJ2R7	Metallic, 2.7 Ω, 1W, ± 5%	1		

Ref No.	Part No.	Part Name & Description	Per Set		Remarks
R102	ERD1AK222	Metal [illegible] 2.2k Ω 1W ±10%	1		
		CAPACITORS			
C1, 2	ECQM1H103KZ	Polyester, 0.01μF, 50V, ±10%	2		
C3	**ECEB50V470**	Electrolytic, 470μF, 50V, −10—+50%	1		
C4	**ECEA63V4R7**	Electrolytic, 4.7μF 63V	1		
C5	**ECEA25V33**	Electrolytic, 33μF, 25V	1		
C6	**ECEA50ZR22**	Electrolytic, 0.22μF, 50V, ±20%	1		
C7	ECQM1H104KZ	Polyester, 0.1μF, 50V, ±10%	1		
C8	**ECEA50ZR33**	Electrolytic, 0.33μF, 50V, ±20%	1		
C9, 10, 11	**ECEA50N1**	Electrolytic, 1μF, 50V	3		
C12	ECQF2334KZ	Polyester, 0.33μF, 200V, ±10%	1		
C13	ECQM1H154KZ	Polyester, 0.15μF, 50V, ±10%	1		
C14	**ECEA35MR10R**	Electrolytic, 0.1μF, 35V	1		
C15	**ECEA50M2R2R**	Electrolytic, 2.2μF, 50V	1		
C16	EC5Z35EFR33E	Electrolytic, 0.33μF, 35V	1		
C17	ECQM1H472KZ	Polyester, 0.0047μF, 50V, ±10%	1		
C18	ECQM1H333KZ	Polyester, 0.033μF, 50V, ±10%	1		
C19, 20, 21	**ECEA50V1**	Electrolytic, 1μF, 50V	3		
C22	**ECEA10V100**	Electrolytic, 100μF, 10V	1		
C23	**ECEA50V1**	Electrolytic, 1μF, 50V	1		
C24	ECQM1H223KZ	Polyester, 0.022μF, 50V, ±10%	1		
C101 [M]	[illegible]	[illegible]	[illegible]		
C101 [MC]	[illegible]	[illegible]	[illegible]		
		CABINET AND CHASSIS PARTS			
1	SFAD200-01B	Dust cover	1		
2	SFAT190-01A	Hinge Ass'y	2		O
3 [M]	SFTG170M01	Turntable Mat	1		
3 [MC]	SFTG170-01	Turntable Mat	1		
4	SFTE190-01A	Turntable	1		O
5	SFUM190M01	Cover, Operation	1		O
6	SFKT190-02E	Knob, Speed Selector	1		O
7	SFKT190-01	Knob, Variable Pitch Control	2		O
8	SFKT170-03E	Knob, Selector	2		
9	SFKT190-04E	Knob, Start	1		
10	SFUK190-02A	Operation Plate Ass'y	1		O
10-1	SFQH160-01	Spring, Operation Plate Ass'y	1		
10-2	SFQH160-03	Spring, Operation Plate Ass'y	1		
10-3	**XTN3+8B**	Spring, Operation Plate Ass'y	2		
11	SFAC190-01	Cabinet	1		O
12	SFUM190-02	Neon Cover	1		O
12-1	**XTN3+8B**	Screw Neon Cover	1		
12-2	**XTN3+8B**	Screw, Tone Arm Ass'y	3		
13 [M]	SFNN190M01	Name Plate	1		*O
13 [MC]	SFNN190C01	Name Plate	1		*O
14	SFMZ190-01Z	D.D. Motor Ass'y	1		O
14-1	**XTN3+8B**	Screw, Motor Ass'y	3		
15	SFUC190-21E	Actuating Plate Ass'y	1		O
16	SFUM190-33	Support, Actuating Plate	1		O
17	SFUB190-21A	Operating Plate Ass'y	1		O
18	SFUM190-31	Support, Switch Plate	1		O
19	SFUM190-28	Plate, Switch	1		O
20	SFUM190-34	Index Plate	1		O
20-1	**XTN3+16B**	Screw, Index Plate	1		

Ref No	Part No.	Part Name & Description	Per Set		Remarks
20-2	SFXW190-21	Washer, Index Plate	1		O
20-3	SFXW190-23	Washer, Index Plate	1		O
20-4	SFXW190-22	Washer, Index Plate	1		O
21	SFUP190-01	Plate, Power Transformer	1		O
21-1	XTN3+8B	Screw, Power Transformer	1		O
22	SFUK190-01E	Base, Automatic Mechanism	1		O
22-1	XTN3+35B	Screw, Base	2		
23	SFUM190-26	Support Gear Setting	1		O
23-1	SFOS190-21	Spring, Support	1		O
24	SFUM190-29	Support, Switch Plate	1		O
26	SFUM190-27	Lever, Switch	1		O
26	SFUG190-21E	Main Gear Ass'y	1		O
26-1	SFXW890801	Washer, Main Gear Ass'y	1		
26-2	XUC5FT	Circlip, Main Gear Ass'y	1		
27	SFUM190-02	Lever, Switch	1		O
27-1	SFOH190-21	Spring, Switch Lever	1		O
28	SFUM190-01	Holder, Neon Lamp	1		O
29	SFUP190-03	Bracket, P.C.B. Ass'y	1		O
30-1	XTN3+8B	Screw, P.C.B. Ass'y	4		
30-2	XTN3+8B	Screw, IC	3		
30-3	SFGC140-01	Spacer, IC	2		
30-4	SFXG140-01	Screw, IC	2		
30-5	XWC3B	Washer, IC	1		
30-6	SFUM190-13	Spacer, P.C.B. Ass'y	1		O
[redacted]					
31-1	SFUM190-12	Clamper, AC Power Cord	1		O
32	SFDH880M01	Phono Cord	1		
33	SFCL028-01E	Ground Wire	1		
33-1	SFUM190-11	Clamper, Phono Cord	1		O
34	SFXN190-01	Nut, Audio Insulator	4		O
35	SFUP190-02	Bracket, Automatic Mechanism	2		O
36	SFAU190-01	Bottom Cover	1		O
37	SFOC200-02	Spring, Audio Insulator	2		
38	SFOC200-01	Spring, Audio Insulator	2		
39	SFGA190-01E	Audio Insulator	4		O
39-1	XTN3+10B	Screw	6		
39-2	XTN3+35B	Screw	6		
39-3	XTN3+8B	Screw	1		
39-4	XTN3+14B	Screw	8		
40	SFPAM19001K	Tone Arm Ass'y	1		O
41	SFPWG19001K	Balance Weight Ass'y	1		O
42	SFPAB12002	Knob, Arm Lift	1		
43	SFPRT17001K	Arm Rest	1		
44	SFPR119001K	Lift Ass'y	1		O
44-1	SFXG829-1	Screw, Tone Arm Lift Adjustment	1		
45	SFPJK19001	Knob, Anti skate Force Control	1		O
46	SFQAR29-03	Spring, Lift Ass'y	1		
47	SFPCC13001K	Head Shell	1		
48	SFPKE119001	Arm Base	1		O
49	SFPGM20001	Pin, Cueing Lever	1		
49-1	XWE26E70BW	Washer, Arm Rest	1		
49-2	XWA26B	Washer, Arm Rest	1		
49-3	XNG26B	Nut, Arm Rest	1		O
50	SFPZB19007	Plate, Arm Rest	1		O
51	SFPAB19002A	Base, Arm Lift	1		O

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
51-1	**XWA3B**	Washer, Arm Lift	2		
51-2	**XTN3+8B**	Screw, Base	4		
52	SFPZB19000	Cam Lift	1		O
53	SFPZB19002	Cam Lift	1		O
53-1	SFPSP19001	Spring, Cam	1		O
53-2	SFPSP19002	Spring, Cam	1		O
54	SFPJL19003K	Cueing Lever Ass'y	1		O
55	SFPAB19003A	Tone Arm Fixing Plate Ass'y	1		O
55-1	SFPSP17004	Spring, Tone Arm Fixing Plate Ass'y	1		
55-2	**XWG3**	Washer, Tone Arm Fixing Plate Ass'y	2		
55-3	**XWA3B**	Washer, Tone Arm Fixing Plate Ass'y	2		
55-4	**XSN3+6S**	Screw, Tone Arm Fixing Plate Ass'y	2		
56	SFDP200-01	P.C.B., Phono Cord	1		
56-1	**XTN3+8B**	Screw, P.C.B.	1		
56-2	SFXW750-1	Washer, Cam Ass'y	1		
56-3	**XTN3+8B**	Screw, Cam Ass'y	1		
57	SFPSH19001	Support, Anti-skate Force Control	1		O
57-1	SFPEW20002	Washer, Support	1		
57-2	SFXW831-5	Washer, Support	1		
57-3	**XTN26+5**	Screw, Support	1		
57-4	**XWG26**	Washer, Support	1		
		ACCESSORIES			
A1 [M]	SFNU190M01	Instruction Book	1		O
A1 [MC]	SFNU190C01	Instruction Book	1		O
A2	**SFWE164A1**	Adaptor, 45 r.p.m.	1		
A3	SFKD135M01E	Overhang Gauge	1		
A4	SFPEV7800	Screw, Cartridge	2		
A4-1	SFCZV8800	Screw, Cartridge	2		
A5	SFWO010	Oil	1		
		PACKING PARTS			
P1 [M]	SFHP190M01	Carton	1		O
P1 [MC]	SFHP190C01	Carton	1		O
P2	SFHH190-01	Pad, Front	1		O
P3	SFHH190-02	Pad, Rear	1		O
P4	SFHD190-02	Pad, Turntable	1		O
P5	SFHD190-01	Pad, Dust Cover	1		O
P6	SFHH170-03	Parts Box, Under	1		
P7	SFHD170-03	Pad, Top (Parts Box)	1		
P8	SFYF60A60	Polyethylene Cover	1		
P9	SFYF45A60	Polyethylene Cover	1		
P10	SFYC22A30	Polyethylene Cover	1		

■ PACKING PARTS